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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/073,597 | 02/11/2002 | Patrick D. Lincoln | US-4446-2 | 5939 |

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SRI International
333 Ravenswood Avenue
Menlo Park, CA 94025

EXAMINER

DIMYAN, MAGID Y

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2825

DATE MAILED: 07/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/073,597

Applicant(s)

LINCOLN, PATRICK D.

Examiner

Magid Y Dimyan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 July 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 27-35 and 39-43 is/are allowed.
- 6) ☒ Claim(s) 1-17, 22-26 and 36-38 is/are rejected.
- 7) ☒ Claim(s) 18-21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 36 in the claims filed July 23, 2002 is objected to because of the following informalities: the claim number referred to in claim 36 (following "the method of claim") is missing. The Examiner believes that it should be changed to "the method of claim 1". Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1 – 3, 6 – 17, 22 – 26 and 36 – 38 are rejected under 35 U.S.C. 102(e) as being anticipated by Tour et al (henceforth, Tour) – Pub. No. US 2003/0058697.

4. Referring to claims 1, 2, 3 and 16, Tour discloses a programmable molecular device that includes a random nano-network (i.e., a two-dimensional logic cell) that includes a plurality of molecular circuit components (see Abstract; Fig. 1). Tour cites how to program and how to determine (discover) the connectivity relationship among the inputs and outputs (i.e., external connections) of the nanocell by applying an appropriate voltage to an input or set of inputs and measuring the output current at an output pin or pins, as claimed herein. The input and output leads can be configured in various configurations. See page 10, paragraphs 0029, 0030 ; page 12, paragraph 0048; page 13, paragraphs 0054, 0055; page 29, paragraph 0162. Furthermore, Tour teaches how the current thresholds can be used to determine if the output pins are “low” or are “high” (i.e., the pins can be grouped accordingly). See page 30, paragraphs 0177 – 0180. Tour recites on page 12, paragraph 0048 that the process is self-adaptive and iterative, i.e., the steps cited are repeated until the programming is completed, as claimed herein.

5. As per claims 6 and 7, see Figs. 4A, 4B; page 30, paragraph 0177 which cite how the current flow threshold is determined, as claimed.

6. As per claims 8 – 13, see Fig. 1; page 10, paragraphs 029 – 030, which contain the same limitations as claimed herein.

7. Referring to claim 14, see page 15, paragraph 0076, which shows how the nanocells, which consist of molecular circuit components and geometries, should be planar, as claimed.

8. As per claim 15, see Fig. 5, which shows how the connectivity relationships of nanocells can be affected by neighboring nanocells.

9. Referring to claim 17, see page 12, paragraph 0048; page 13, paragraph 055; page 28, paragraph 0152; and page 29, paragraphs 0157 - 0162, which cite how an input voltage with certain polarity and time duration can be used in programming the nanocells (i.e., change the state of a cell or number of cells). See also Figs. 9 and 10 for a nanocell that has been programmed.

10. As per claims 22 and 23, see Abstract; page 11, paragraph 0037; page 13, paragraph 0055, which disclose that the molecular components used in the nanocell exhibits negative differential resistance, and devices within the nanocell can switch at different potentials, as claimed herein.

11. Referring to claims 24, 25 and 26, see Page 13, paragraphs 0056 – 0061; page 14, paragraphs 0062 – 0069, which teach how the cells can be programmed and reprogrammed (i.e., devices can also have a known state before applying the first

pulse) as claimed herein. See also Fig. 5, which shows how logic cell programming can be affected by neighboring nanocells.

12. As per claims 36, 37 and 38, see Abstract; Fig. 1, which teach the same limitations of programming the logic cell as claimed herein.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tour in view of Jain (U.S. Patent No. 6,560,758).

15. The teachings of Tour are cited above, and described in detail in the disclosure. Although Tour recites the use of truth tables in his invention, he does not specifically refer to OBDDs (Ordered Binary Decision Diagrams) in the disclosure. Jain, on the other hand, teaches a method for verifying and validating digital circuits by decomposition and partitioning that makes use of OBDDs. See Fig. 2; column 1, line 49 to column 2, line 7. As cited by Jain, the use of OBDD is well known in the art for

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eliminating redundancy and simplifying logic circuits, and ensuring that each input is restricted to appear only at one level of the Binary Decision diagrams. It would therefore be obvious to one having ordinary skill in the art at the time the invention was made to combine the inventions of Tour and Jain to obtain the same inventions, as claimed herein.

Allowable Subject Matter

16. Claims 18 – 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

17. Claims 27 – 35 and 39 – 43 are allowed.

18. The following is a statement of reasons for the indication of allowable subject matter: these claims pertain to a method of programming, or re-programming, a series of interconnected devices that include the steps of applying more than one pulse (also, a series of voltage pulses) with various polarities and varying durations, in order to program only some of the devices. Prior art does not teach these inventions as claimed herein.

Conclusion

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 6,430,511 to Tour et al cites a molecular computer, which is formed by establishing arrays of spaced-apart input, and output pins and is composed of a self-assembled array of specifically selected and adapted molecules, called "moleware".

U.S. Patent No. 6,322,713 to Choi et al discloses nanoscale conductive connectors particularly useful for connecting microscale devices consisting of free-standing nanoscale conductors.

U.S. Patent No. 6,320,200 to Reed et al recites an IC structure that includes a plurality of transistors; a plurality of thin-film conductor interconnects interconnected to form circuits in a predetermined configuration, and a plurality of pairs of contact pads.

Pub. No. US 2002/0053063 to Bhattacharya et al teaches an automated method for designing an IC design-specific cell.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Magid Y Dimyan whose telephone number is (703) 308-1354. The examiner can normally be reached on Monday - Friday 8:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S Smith can be reached on (703) 308-1323. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

Magid Y Dimyan
Examiner
Art Unit 2825

myd
July 9, 2003



VUTHE SIEK
PRIMARY EXAMINER